AN ASSESSMENT OF THE USE OF MICROCOMPUTERS IN KANSAS VOCATIONAL AGRICULTURE PROGRAMS

by

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CHAPTER I

Introduction

Microcomputers have become an integral part of modern society. The uses of microcomputers in the nation range from pre-schoolers learning the alphabet to corporate presidents making decisions. Not surprisingly, microcomputers have become an intrinsic part of the two largest industries in the United States -- agriculture and education. The different uses of microcomputers in agriculture continues to expand as their capability increases and their price decreases. As a consequence of this development, small agricultural operations can now take advantage of microcomputer technology. Microcomputers are becoming commonplace in small family farms as well as larger agri-businesses. Both large and small operations realize the importance of using new technologies to increase profit margins more efficiently in this era of slim margins (Leising, 1982).

The use of microcomputers in education also continues to spread as a consequence of increase in flexibility and decrease of price. Microcomputers may be found in the smallest rural school as well as the largest urban school. It is clear there is a need for students to understand the uses of computers in their lives (Bork, 1985). The question is what uses do they need to understand? According to Rohrbach and Stewart (1986) the exact role of the microcomputer in the learning process has not been well established.

Bork (1985) commented that very often when computers do arrive at schools there is very little understanding on how to use them. He also stated that learning rather than technology should be emphasized. The use of microcomputers is a means to an end. Over the next 25 years the microcomputer will become the dominant delivery system in education. Bork concluded the future is more important than the present and that educators must look to the future. As the microcomputer becomes more abundant in the vocational agriculture classroom, agricultural educators are looking toward that future and are asking what should be taught (Miller and Kotrlik, 1987, Newman and Henderson, 1987).

There is no question though that agricultural education should be using microcomputer instruction as one technique of teaching (Hudson, 1980). Vocational agriculture instructors need to teach their students about how microcomputers apply to agriculture. Basic computer literacy will probably come from other instructional areas, but vocational agriculture will be the area to show students how that literacy applies to agriculture. A computer teacher would have the same difficulty showing a student how to set up a computerized feed ration for a hog as a driver training teacher would have showing a student how to plow a field. Vocational agriculture teachers must stay current if they want to accomplish the task of teaching students about modern agriculture. Miller and Foster (1985) comment that it is easy for vocational agriculture teachers to find themselves behind in the

areas of educational and agricultural computer technology. They further remarked that steps should be taken to help teachers upgrade their computer skills and integrate computers into their instructional program. Bowen (1985) observed that many vocational agriculture teachers secured microcomputers without the benefit of pre-service or in-service instruction on how to operate them or what part they should play in instruction. He further noted this was being corrected and that development of teaching materials and in-service activities must continue if the benefits of this technology are to be maximized. Microcomputer technology is extremely dynamic (Jaff, Oglesby, and Drewes, 1982). The role of the microcomputer in vocational agriculture education will evolve as computer technology becomes more sophisticated. The first generation computer was a large machine comprised of vacuum tubes and used immense amounts of power. In the second generation, computer transistors replaced vacuum tubes and consequentially reduced the size and power requirements. Integrated circuits and programming are characteristics of the third generation computer. The fourth generation computer is the personal or microcomputer with its small, powerful microchip. This is not the last generation. The fifth generation has already been born and is maturing. Previous generations of computers operated sequentially with one central processing unit (CPU) dealing with a sequence of instructions. These instructions are known as programs. The fifth generation computers

will be parallel in operation with numerous CPUs working together. Sequential programming languages will no longer be adequate. New languages based on logic will allow computers to give advice. The prototype of this new language is PROLOG or PROgramming in LOGic. Users will be able to address the computer in our own natural language or with graphics. Some microcomputers already accept some spoken commands. Others already have graphical features using a hand held "mouse" (Ennals and Cotterell, 1985). The possibilities for education with these new computers are limitless. Interactive video is already being used in business for education and training. Camp (1983) sees the use of computer-assisted interactive video in the vocational agriculture classroom as a natural step. In addition Camp asserted that "... by far our most important use for the microcomputer is in teaching our students how they will use it in their jobs" (page 9). He stated that microcomputers are a tool that vocational agriculture teachers should use. He further concluded that the vocational agriculture teachers' role is not to be programmers- their role is to select, evaluate, and utilize courseware appropriate to their program.

Microcomputers have become a part of agriculture and education. Their role in both areas will change rapidly as technology continues to advance. The role of microcomputers has probably already effected Kansas vocational agriculture programs and will certainly effect them in the future. In order to plan for the changing role of microcomputers in Kansas vocational agriculture programs, an

assessment must first be made of their present role. There is no data available pertaining to the present role of microcomputers in Kansas vocational agriculture programs. In order to prepare a strong future for microcomputers in Kansas agricultural education existing uses must be evaluated. Instructors' perceptions of strengths and faults of microcomputers in agricultural education must be identified so appropriate pre-service and in-service activities may be planned. Computer skills that need to be taught have to be identified first.

Purpose

The twofold purpose of this investigation is to assess the status of computer usage and to measure teacher perceptions of conditions inhibiting microcomputer implementation in Kansas vocational agriculture programs.

Objectives

The following specific objectives will serve as the parameters for the acquisition and analysis of data to achieve the purpose:

1. To identify software being used in Kansas vocational agriculture programs;

2. To identify current uses of microcomputers in Kansas vocational agriculture programs;

3. To determine the types of hardware being used in vocational agriculture programs;

4. To identify factors that inhibit use of microcomputers in vocational agriculture programs;

5. To determine what microcomputer related in-service activities vocational agriculture instructors would attend;

6. To determine the relationships between vocational agriculture instructors' perceptions of factors inhibiting microcomputer usage and: years of teaching experience, number of students enrolled in vocational agriculture, and number of students in high school;

7. To determine the relationships between number of microcomputers in the vocational agriculture program and: years of teaching experience, number of students enrolled in vocational agriculture, and number of students in the high school;

8. To identify any differences between instructors that use computers in their program and instructors that do not use computers in their program in regards to requested in-service activities and perceptions of possible factors inhibiting computer usage.

Definition of Terms

Definition of terms used throughout this investigation are provided to avoid possible misunderstandings of how these terms are used in this study.

Ag specific software -- programs that deal with topics that are agricultural in nature.

Database -- program used to file information.

Hardware -- the physical parts of the computer system.

Instructors/Teachers -- Person(s) that conduct secondary education vocational agriculture programs.

Integrated Program -- software that combines a word processor, spreadsheet, and database into one program.

Memory -- the place in the computer's main unit that stores information with the capacity being expressed in bytes of information (1 K = 1000 bytes)

Microcomputer, computer -- low cost, portable, personal electronic machine that calculates, assembles, stores, or processes and prints information derived from coded data in accordance with a predetermined program.

Modem -- a peripheral device used in conjunction with a computer to access other computers over telephone lines.

Peripheral device -- a piece of computer hardware - such as a disk drive, printer, or a modem - used in conjunction with a computer and under the computer's control.

Software -- programs, or instructions for the computer to carry out.

Spreadsheet -- program used to calculate numbers.

Utility software -- programs that are used by teachers to assist in the managing of instruction, such as test generators or grade recording programs.

Vocational agriculture department/vocational agriculture program -- offers instruction in vocational agriculture education at the secondary education level.

Word Processor -- program that is used to write and edit text, an electronic typewriter.

Limitations

The study is limited in that it was conducted solely in one midwestern state. It is further limited in that it makes use of an intact group in only one field of education, which would limit the generalization of the results to other disciplines. The use of a non-standardized instrument may be a weakness of this study.

CHAPTER II

Review of Literature

This chapter presents a review of research and related literature concerning the use of microcomputers in vocational agriculture. The following sections are outlined in presenting the review of research and literature:

1. Hardware and software being used in vocational agriculture.

2. The role of the microcomputer in vocational agriculture.

3. Factors inhibiting the use of microcomputers in vocational agriculture.

A review of related research indicated that microcomputers are playing an increasingly important role in vocational agriculture. The usage of microcomputers is moving from an awareness and literacy stage to a more prominent role in vocational agriculture (Bowen, 1985). With the advent of the microchip has come a corresponding decrease in the size and price of microcomputers. The Apple II microcomputer is a good example of this reduction. In 1982, an Apple II with 16 K of memory cost $3,130.00 (Coburn, 1982) while in 1987 ,

according to the Apple Computers, Inc. price list, an Apple IIe with 128 K of memory retailed for $1,300.00 and could be bought by schools for substantially less. The increasing number of computers into schools raised the question of how to effectively use them in vocational agriculture. Bork (1985) comments that when computers do arrive at the school there is little understanding on how to use them. In a study of teachers' perceptions of the need for computers in Georgia vocational agriculture, Yarbrough (1985) reported that 16% of the respondents said that inadequate teacher knowledge of computers was a factor hindering the expansion of computer use in vocational agriculture. Seeber (1983) was "confused and amazed by the rapid changes in the microcomputer field" (p. i). Dunn (1985) remarked that educators need to develop new skills to keep up with the rapidly changing tools available to them. Eliminating these, as well as other factors, should increase the effectiveness of microcomputers in vocational agriculture programs.

Hardware and Software

There have been a number of recent studies, most of them regional, on the hardware and software available or present in vocational agriculture programs. Zidon and Luft (1987) found in a study of North Dakota secondary vocational agriculture programs that 59 of the 81 vocational agriculture programs had at least one

computer. The predominant brand was Apple, accounting for 71.6% of the computers in North Dakota vocational agriculture programs. The 22 departments that did not have a computer did have access to one in their school. It was also reported that "decision aid programs" were the most common software type used in North Dakota vocational agriculture programs with 57 of the 81 departments having them. Brown, Townsend, and Carnes (1985) completed a study of Texas vocational agriculture programs and reported that 79 out 402 respondents used computers in their program. Apple accounted for 47.9% of the computers being used, with Radio Shack accounted for 28.6%. Commodore, IBM, and Texas Instruments were the next three most popular brands. Miller, Richardson, and Haskell (1984) reported that the Apple II series was the machine most commonly used by responding Iowa vocational agriculture instructors. In addition, they found that 86% of the respondents had printers and 3.5% of the respondents had modems. In an investigation of the integration of computer based instruction into Texas vocational agriculture programs by Cepica et al. (1984), it was reported that only 7.6% of the instructors that responded had a computer in the vocational agriculture department. Forty-two percent of the respondents indicated that computers were available for vocational agriculture student use; however, they were located elsewhere in the school. Of the computers being used, the most popular brands were Apple and Radio Shack. Furthermore, it was reported that less than 50% of the

respondents had any commercial software in use. Church and Foster (1984) completed a study of the perceptions of vocational agriculture teachers in the northwestern United States regarding knowledge of microcomputers. They observed that 64% of Oregon vocational agriculture teachers had access to computers while only 36% of Washington and Idaho vocational agriculture teachers had access. Apple was the most common brand of the accessible computers. In a nationwide study by Miller and Kotrlik (1987), it was found that only 39% of the vocational agriculture teachers in the sample had computers. An additional 23% of the respondents indicated they used computers located either elsewhere in school or at home, which increased the number of respondents using computers to 62%. Apple was the main brand of computer as reported by the teachers (64.7%) followed by Radio Shack (14.3%) and Atari (9.8%). The remaining 11.2% was comprised of a variety of other brands.

The Role of the Microcomputer

Taylor (1980) suggested there are three roles for the computer in education: (1) the role of a tutor, (2) the role of a tool, and (3) the role of a tutee. Giesemann (1985) referred to these three roles in instruction: (1) as the medium of instruction, (2) as the manager of instruction, and (3) as the object of instruction. The most common role is that of tutor. (Taylor, 1980; Camp, 1983; Coburn, et al.,1982).

This is where the subject matter is presented to the students by the computer. This is also referred to as computer assisted instruction (CAI), computer assisted learning (CAL), and computer based learning as well as other terminology (Bork, 1985). In computer based learning, students work with programs developed by others. These programs are subject-matter oriented, just as books are. Chambers and Sprecher (1983) divided CAI into three categories; drill and practice, tutorial, and simulation. Giesemann (1985) as well as Cepica et al. (1984) divided computer based learning into four categories; drill and practice, tutorial, problem solving, and simulation. Drill and practice programs practice subject matter that has already been presented. These programs can be utilized either individually or by groups. Tutorial programs emphasize a question-answer, dialogue-type learning to present new material. These programs often make use of graphics and animation to increase motivation of the student. The student is asked questions following the presentation of material and if the questions are answered correctly the computer provides more advanced information. If the student answers incorrectly, the computer corrects the student and the student must answer the question correctly before moving on. With problem solving, the computer can be used to perform tasks to solve a problem that had been developed in class. An example would be calculating amortization rates in an agricultural business class to determine what interest rate is best -- a fixed rate or a variable rate. The fourth use is

simulation. Simulation is using the computer to let the student explore complex interactions that couldn't be explored, due to time or expense, in the classroom. Zidon and Luft (1987) found in their assessment of microcomputer use in North Dakota vocational agriculture programs that microcomputers were being used in all units of instruction by one or more teachers. "Decision aid" and tutorial programs were the most used in such instructional units as farm business, supervised occupational experience , animal nutrition, advanced crop science, and FFA leadership. Seeber (1983), in a study of computers in Kansas vocational education, indicated that computer usage in Kansas vocational agriculture programs extended beyond routine drill and practice. Computers were being used in formal and informal networks and that programs being used in the classroom were generally the same ones as being used by farmers. Findings from a nationwide study by Miller and Kotrlik (1987) of vocational agriculture microcomputer use indicated that in computer aided instruction the largest percentage of teachers used the computer for problem solving. Cepica et al. (1984) observed that computers were used the most in the instructional area of agricultural production. Miller, et al. (1984), in a study of personal computers in Iowa vocational agriculture programs, concluded that the most common areas of usage included class instruction, independent study, and for a computer instructional unit. They also reported that the most common software used by teachers included spreadsheet programs,

teaching material generating programs, and word processing programs.

The second role for microcomputers as reported by Taylor (1980) was that of a tool. Giesemann (1985) designated this role of the computer as the manager of instruction. In this role, the computer is used to manage tasks related to instruction. Bork (1985) ascertained that data gathering and data interpreting were the primary focus of computers in relation to computer managed instruction. Neason and Miller (1982) concluded that the primary role of the microcomputer in vocational agriculture should be that of a tool and that the computer forms one part of the teaching unit along with other teaching methods. The use of the microcomputer in computer managed instruction is only limited by the educator's imagination. Camp (1983) mentioned typing, storing lesson plans, test-item pools, course outlines, transparencies, handouts, newsletters, student handbooks, mailing lists as a means of managing instruction. Additionally, there are the five primary areas of diagnostics, test scoring, prescription of instruction, instructional recordkeeping, and non-instructional recordkeeping as areas of computer managed instruction. Other areas such as storing records for supervised occupational experience programs and FFA programs as well as applications for FFA awards were mentioned by Giesemann (1985) and Malpiedi (1985). Miller and Kotrlik (1987) found that management practices such as instructional materials preparation,

word processing, and data base use were employed equally as often by vocational agriculture teachers sampled nationwide. They also concluded that computers were currently being used in vocational agriculture programs more for instructional management (as a tool) than they were for instructional purposes. Zidon and Luft (1987) established that microcomputers were often used for non-instructional purposes. The most frequent use of these non-instructional purposes included word processing, correspondence, entertainment, and test generation.

The third role of the computer as defined by Taylor (1980) was that of of the tutee, or as the object of instruction. This is where the student learns about the computer. Learning about the computer includes learning how to program. This is where the student actually "teaches" the computer. At the high school level (includes all subjects), learning how to program accounts for approximately 80% of all current usage. It is not essential for all students to learn programming even though it presently accounts for such a large percentage of usage according to Bork (1985). Dunn (1985) ascertained that most instructors outside of computer education do not need to know programming. Camp (1983) pointed out it is not the role of the vocational agriculture teacher to be a programmer, rather their role is to select, evaluate, and utilize software appropriate for their programs. Wiggins and Trede (1985) suggested that the role of the vocational program is to perhaps emphasize the application and

use of computer programs rather than the actual programming of computers. In a study of teacher and employer perceptions of skills needed by secondary agribusiness students by Newman and Henderson (1987), it was revealed that both teachers and employers perceived application of existing software as more important than programming skills. Miller and Foster (1985) completed an assessment of microcomputer competencies needed by vocational agriculture instructors in Nebraska and Iowa and found that of the nine competencies related to programming , only one , "make small changes in a program", was considered highly important by the respondents. In a nationwide study by Miller and Kotrlik (1987) of microcomputers in vocational agriculture, respondents ranked programming 18th in importance out of a list of 20 competencies. One-half of the respondents in a study of integration of microcomputers into Texas vocational agriculture programs indicated they would attend an in-service in BASIC programming.

Factors Inhibiting Use of Microcomputers

Research indicates that the computer in vocational agriculture programs is still the exception not the rule (Miller and Kotrlik, 1987; Brown, et al., 1985; Cepica et al., 1984; Church and Foster, 1984). There are a number of reasons for the slow integration of microcomputers into vocational agriculture programs. Zidon and Luft

(1987) pointed out in their study of North Dakota vocational agriculture programs that many teachers of vocational agriculture have been in the classroom longer than microcomputers have been available to schools. These instructors did not receive instruction on the use of microcomputers during their undergraduate career. Many vocational agriculture teachers feel frightened and have anxiety toward microcomputers (Ratcliff, 1985). Miller, et al. (1984) concluded from a study of microcomputers in Iowa vocational agriculture programs that expensive software and lack of teaching materials with computer software continue to be barriers to the integration of microcomputers. The authors suggested that universities and other public agencies, which act as support for vocational agriculture programs, could assist in the development of quality software and teaching materials. In a study conducted by Bowen, Mincemoyer, and Parmley (1983) of the use of computer technology in vocational agriculture teacher education, it was reported that less than one-half of the teacher education programs in agriculture provided some means for future vocational agriculture instructors to obtain some type of microcomputer background. Miller and Kotrlik (1987) remarked that vocational agriculture programs would be more likely to have computers if their principal and school board supported the use of microcomputers. Cepica et al. (1984) found that there was a critical shortage of practical and economical agricultural related software available for Texas vocational agriculture

programs. They also reported that 96% of the respondents expressed interest in a in-service dealing with basic computer instruction. It was further suggested that universities need to provide pre-service at both beginning and advanced levels for vocational agriculture instructors. Respondents in a study by Church and Foster (1984) suggested that additional in-service education would be desirable in the use of microcomputers in vocational agriculture programs. Neason and Miller (1982) remarked that there is very little software geared toward vocational agriculture instruction. The authors also implied that there were problems in hardware design, teacher training, attitudes of teachers, and software quality. They further concluded that teacher training and software development are several years behind hardware design.

Summary

This chapter has presented a review of research and literature which are relevant to this study. These findings have disclosed several important points.

1. Microcomputers are being utilized by vocational agriculture instructors nationwide. Vocational educators in agriculture have recognized the importance of microcomputers in the instruction of vocational agriculture.

2. The use of microcomputers in vocational agriculture is still in the formative stage. The use of microcomputers, as well as relevant applications, is still a new experience for the majority of vocational agriculture instructors.

3. Microcomputers are being used to assist in instruction as well as to assist in the managing of instruction. The ways to best utilize computers in these areas have not yet been determined.

4. There are many factors that inhibit the implementation of microcomputers into vocational agriculture. These factors need to be identified so strategies may be developed to overcome these limitations.

5. Computer technology is progressing at an astonishing rate. Vocational educators in agriculture must keep pace with this technology in order to effectively utilize it in the instruction of vocational agriculture.

These points from the review of the literature seem to further strengthen the need to accurately assess the present use of microcomputers in Kansas vocational agriculture programs.

CHAPTER III

Methods and Procedures

This study was comprised of a descriptive survey of the use of microcomputers in Kansas vocational agriculture programs. This chapter will present population, procedures, instrumentation, and analysis of data to explain methods used in this study.

Population

The target population of this study was all of the secondary vocational agriculture programs in Kansas. The total number of secondary vocational agriculture programs in Kansas listed in the "1987-1988 Kansas Agricultural Education Instructors Directory" was 158.

Procedure

A random sample of 87 Kansas secondary vocational agriculture programs was selected from the "1987-1988 Kansas Agricultural Education Instructors Directory". A sample of 87 was used to insure a random sample of the population if there was a low return rate. The instructors surveyed from multiple teacher departments were also

randomly selected. The 87 randomly selected instructors were sent a questionnaire (Appendix A) and transmittal letter (Appendix B) on January 3, 1988. On January 15, 1988, a follow-up letter (Appendix C) was sent to the 29 non-respondents. After an additional 12 days, another questionnaire and follow-up letter (Appendix D) were sent on January 27, 1988 to the 13 remaining non-respondents. Six more responses were received after the second follow-up bringing the total of respondents to 81 for a response rate of 93.1%. Table 1 presents a summary of these data.

Table 1

Data Collection(N=81)

Sending Date	Number of S	Percent
January 3	58	72.0
January 15	16	20.0
January 27	6	8.0
Total	81	100.0

Of the questionnaires returned, 79 usable returns were used for data analysis giving a usable response rate of 90.9%. Respondents from the initial mailing were classified as early respondents and respondent from the follow-up mailings were classified as late respondents. An independent t-test was used to determine if differences existed among the demographic characteristics of early respondents and late respondents. Late respondents were assumed typical of non-respondents (Newman, 1962; Ferber, 1948). Since the t-test revealed no significant differences, it was determined that all respondents were representative of the target population. The findings were then pooled to constitute the data used for this study.

Instrumentation

A questionnaire based on instruments developed by Cepica, et al. (1984), Brown, et al. (1985), and Zidon and Luft (1987) was developed to obtain the data needed for the study. The questionnaire consisted of five parts. Part I dealt with demographic data. Demographic data collected included high school student population, vocational agriculture department student population, years of teaching experience, state district, and usage of computers in the vocational agriculture program. Part II was concerned with computer hardware used in the vocational agriculture program. Part III pertained to software types and uses in the vocational agriculture

program. Part IV measured what in-service activities vocational agriculture instructors would attend. Part V quantified teacher perceptions of possible factors inhibiting use of computers in a vocational agriculture program. After initial construction of the survey instrument, agricultural education faculty and graduate students (Appendix E) assisted in refining items and establishing content validity.

Analysis of Data

Descriptive statistics were calculated for all variables. Data collected from Part I consisted of the independent variables. Parts II, III, IV, and V comprised the dependent variables. Means and standard deviations were calculated for number of students in the high school, number of students in the vocational agriculture department, and years of teaching experience. Frequency counts for computer usage, computer location, computer brands, computer peripherals, types of software, instructional areas of computers use, management activities that are computer aided, and in-service activities were computed. Means and standard deviations were also calculated for possible factors inhibiting use of microcomputers in vocational agriculture programs.

Inferential statistics were calculated. Respondents were divided into two groups. Group one was comprised of respondents

This group was named the User Group. Group Two was comprised of respondents that do not plan on using computers ever or do not plan on using them until sometime after the 1989 school year (Non-User Group). A t-Test was used to determine if there were any significant differences between the user group and the non-user group perceptions' about possible factors inhibiting the use of microcomputers in vocational agriculture programs. The Chi Square for Association was also calculated to see if there was any significant difference between the users group and non-users group responses' to what in-service activities they would attend. Pearson Product-Moment Correlation was calculated to determine if there was any relationship between demographic data and the number of computers in the vocational agriculture department. Pearson's r was also calculated for the demographic data and teachers' perceptions about possible limiting factors toward the use of microcomputers in vocational agriculture programs. An alpha level of .05 was chosen for all of the analysis done.

The analysis of all data was completed on an Apple Macintosh Plus. The statistical package that was used was the Macintosh Statistical System by StatSoft.

CHAPTER IV

Data Analysis

Introduction

Data presented in this chapter discloses the findings of a survey assessing the usage of microcomputers in Kansas vocational agriculture programs. The information and findings of this study are reported in the following order:

1. Descriptive statistics for demographic data, hardware, software, uses, in-service activities, and factors inhibiting use.
2. Characteristics of user and non-user groups.
3. Factors inhibiting use.
4. Correlation for selected demographics.

Descriptive Statistics

Demographic data were collected on each subject in order to determine wether any demographic variables were related to number of computers in vocational agriculture departments and vocational agriculture instructors' perceptions of possible factors inhibiting the use of microcomputers. Demographic data were also collected to

determine if there were any significant differences between users and non-users in regards to instructors' perceptions of possible factors inhibiting microcomputer use and preferred in-service activities. Results of further analyses of demographic data will be reported later in the chapter.

Subjects were asked to report the number of students in their respective school (309), the number of students in the agriculture department (42), and their years of teaching experience (11.75). Table 2 reports the mean and standard deviation of the results.

Table 2

Mean and Standard Deviation for Various Demographic Data of Respondents

Variable	Mean	S.D.	N
Number of students in high school	309.0	315.08	71
Number of students in ag department	42.0	26.08	75
Years of teaching experience	11.75	9.62	79

Table 3 presents data pertaining to the usage of computers in Kansas vocational agriculture programs involved in the study.

Table 3

Frequency and Percent of Microcomputer Use in Kansas Vocational Agriculture Programs (N=79)

Use	Frequency	Percent
Presently use computers	64	81.01
Will be using computers by 1989	7	8.86
No longer use computers	0	0.00
Do not plan to use computers	2	2.53
Plan to use computers sometime after 1989	6	7.60
Total	79	100.00

The vast majority of respondents (81.01%) presently use computers in their vocational agriculture programs. Only two respondents (2.53%) never plan to use computers in their programs. By the year 1989, 89.87% of the respondents will be using computers. This is a larger percentage then has been reported in previous studies. In previous studies, the percentage of respondents using computers has ranged from 36% to 64% (Miller and Kotrlik, 1987 ; Church and Foster, 1984; Brown, et. al.,1985).

Table 4 reports the location and number of microcomputers available to the respondents' programs.

Table 4

Mean and Sum of the Locations of Microcomputers Available for Use in Vocational Agriculture Classes (N=71)

Location	Mean	Sum
Computer Laboratory	7.21	512
Vocational Agriculture	1.92	136
Business	1.90	135
Math	1.06	75
Other	.96	68
Science	.47	33
Home Economics	.37	26
Industrial Arts	.31	22

Computer laboratories had the most computers (512) available for vocational agriculture program followed by vocational agriculture departments themselves (136). Business departments were another location that had a large number (135) computers available for vocational agriculture programs. These findings are similar to studies by Zidon and Luft (1987) and Cepica et al. (1984) in which vocational agriculture programs that did not have computers in the agriculture department had access to computers elsewhere in the high school. Respondents that presently use computers or will be using them by 1989 had an average of almost two (1.92) computers per agriculture department.

Table 5 shows the brands of microcomputers found in the vocational agriculture departments of the respondents.

Table 5

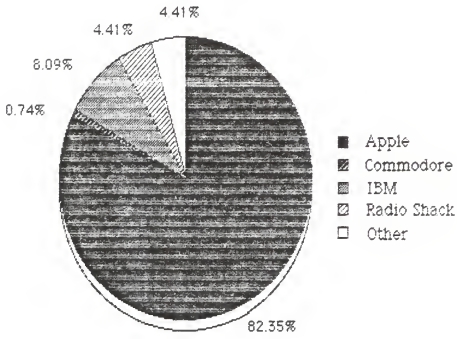
Frequency and Percent of Brands of Computers in Vocational Agriculture Departments
(N=71)

Brand	Frequency	Percentage
Apple	112	82.35
Commodore	1	.74
IBM	11	8.09
Radio Shack	6	4.41
Texas Instrument	0	0.00
Other	6	4.41
Total	136	100.00

Apple (112) was by far the predominant brand found in agriculture departments followed by IBM (11) and Radio Shack (6). Figure 1 graphically illustrates the predominance of Apple computers.

Figure 1

Computer Brands in Agriculture Departments



Apple being the most common brand of computer among respondents is consistent with earlier studies. In other studies, Apple's representation among brands of computers has ranged from 47.9% to 71.6% (Brown, et al., 1987; Zidon and Luft, 1987; Miller, et al., 1984; Miller and Kotrlik, 1987; Church and Foster, 1984). The sole exception to this is the study by Cepica, et al. (1984) in which Radio Shack was the predominant brand of microcomputer.

It can be seen by observing Table 6 the types and numbers of microcomputer peripherals available for vocational agriculture programs as disclosed by respondents.

Table 6

Frequency and Percent of Types of Microcomputer Peripherals in Vocational Agriculture Departments (N=71)

Peripheral	Frequency	Percentage
Extra disk drive	59	83.10
Dot matrix printer	59	83.10
Modem	22	30.99
Daisywheel printer	8	11.27
Digitizer	3	4.23
Plotter	3	4.23
Hard disk	2	2.82
Other	6	8.45

An extra disk drive (59) and a dot matrix printer (59) were the two most reported peripherals available for use in agriculture programs. A modem (22) was also a popular peripheral. The number of printers and extra disk drives available to respondents is similar to other studies of microcomputers. However, the number of modems reported by respondents is greater than the number reported in previous studies (Miller, et al., 1984; Cepica, et al.,1984). This is probably due to the greater amount of services now available for computer users with a modem.

Figures contained in Table 7 show the types of software available for respondents' vocational agriculture classes.

Table 7

Frequency and Percent of Types of Software in Vocational Agriculture Departments (N=71)

Software Type	Frequency[a]	Percent
Agricultural specific	60	84.51
Word processor	48	67.61
Spreadsheet	47	66.20
Integrated	40	56.34
Utility	39	54.93
Games	29	40.85
Database	17	23.94
Other	15	21.13

[a]The total number is greater than the number of departments because some departments had more than one type of software.

Agricultural specific software (84.51%) was the most reported type of software available for vocational agriculture classes. Spreadsheet software (66.20%) and word processing software (67.61%) were the next two most often reported types of software. Integrated software (56.34%), which contains spreadsheets, word processors, and data bases, was also available for the majority of respondents. These

findings are very similar to the findings of Zidon and Luft (1987)in their study of North Dakota vocational agriculture programs.

The most frequently used types of programs are presented in Table 8. Agricultural specific software (32.79%) was the most frequently used software as reported by respondents. Integrated software (31.15%) was the second most used type of software followed by word processing software (16.39%) and spreadsheet software (13.11%).

Table 8

Frequency and Percent of Most Used Type of Software In Vocational Agriculture (N^a=61)

Software Type	Frequency	Percent
Agricultural specific	20	32.79
Integrated	19	31.15
Word processing	10	16.39
Spreadsheet	8	13.11
Teacher utility	2	3.28
Games	1	1.64
Other	1	1.64
Database	0	.00
Total	61	100.00

[a]Ten respondents did not respond to the question.

The instructional areas that respondents disclosed they use a microcomputer to assist in instruction are summarized in Table 9.

Table 9

Frequency and Percent of Vocational Agriculture Instructional Areas in which Microcomputers are Used (N=71)

Instructional Area	Frequency	Percent
Farm Management	59	83.10
Agri-Business	49	69.01
Animal Science	47	66.20
Ag Mechanics	42	59.15
Leadership (F.F.A.)	35	49.30
Crops and Soils	34	47.89
S.O.E.P. (Class)	19	26.76
Horticulture	18	25.35
Ag Careers	17	23.94
Adult Classes	11	15.49

Microcomputers were being used to assist in instruction in all areas of vocational agriculture as reported by respondents using microcomputers. The instructional area that microcomputers are most often used in to assist in instruction is the area of Farm Management (83.10%). Agribusiness (69.01%), Animal Science (66.20%), and Agricultural Mechanics (59.15%) were also areas of instruction that

the majority of respondents reported that they used microcomputers to assist in instruction. These findings are similar to the study of Zidon and Luft (1987) with the exception of agricultural mechanics. Agricultural mechanics was not an area of instruction where microcomputers were commonly used in the North Dakota study. Another difference was the use of computers in the area of supervised occupational experience programs (S.O.E.P.). The use of microcomputers in the instruction of S.O.E.P. according to Zidon and Luft was the second most common area (53.3%) of instruction in which respondents used microcomputers to assist instruction. In comparison, only 26.76% of the respondents that used computers in this study reported they used computers to assist in instruction of S.O.E.P.

Data provided by the respondents and summarized in Table 10 showed the management activities in which microcomputers were used. Word processing class materials (77.46%) and word processing correspondence (69.01%) were the two management activities that were reported most often by respondents in which microcomputers were used to assist in management. Test generation (54.93%) and mailing lists (52.11%) were also reported by the majority of respondents as management activities in which microcomputers were used for assistance. These findings are very similar to a study by Zidon and Luft (1987).

Table 10

Frequency and Percent of Vocational Agriculture Management Activities in which Microcomputers are Used (N=71)

Management Activity	Frequency	Percent
Word processing class materials	55	77.46
Word processing correspondence	49	69.01
Test generation	39	54.93
Mailing lists	37	52.11
FFA secretary duties	34	47.89
Creating puzzles/quizzes	32	45.07
SOE record keeping	30	42.25
Word processing other	29	40.85
FFA financial records	27	38.03
Spreadsheet for office	26	36.62
Grades management	24	33.80
Entertainment	23	32.39
SOE/FFA awards	22	30.99
Contest tabulation	9	12.68

Table 11 presents data pertaining to computer related in-service activities that respondents would attend.

Table 11

Frequency and Percent of Microcomputer In-Service Activities Vocational Agriculture Instructors Would Attend (N=76)

In-Service	Frequency	Percent
Using vo-ag software	25	32.89
Wish to attend more than one	15	19.74
Using spreadsheets	10	13.16
General computer literacy	6	7.89
Would not attend	6	7.89
Using integrated software	5	6.58
Using wordprocessing	3	3.95
Beginning programming	3	3.95
Using databases	2	2.63
Using modems	1	1.32
Total	76	100.00

An in-service activity dealing with agricultural specific software was the activity that most respondents (32.89%) indicated they would attend. An in-service activity dealing with spreadsheets was marked by 13.16% of the respondents. Even though respondents were asked to list only one choice, 19.74% of the respondents listed more than one choice. Agricultural specific software and spreadsheet software related activities were both mentioned by all of the respondents

marking more than one response. Six (7.89%) of the respondents would not attend any computer related in-service activity. Only six (7.89%) marked a general computer literacy in-service activity as compared to a study by Cepica, et al. (1984) where 98% of the respondents requested instruction in basic computer literacy.

Subjects were asked to respond to a series of survey items which assessed their perceptions of possible factors that inhibit use of microcomputers in a vocational agriculture program. These data are presented in Table 12. A six point Likert scale was used to assist respondents to describe their perceptions. Means above 3.5 were used to indicate agreement with an item; those means below 3.5 indicated disagreement with an item. Respondents strongly indicated that the lack of time by instructor to learn more about computers was the primary factor inhibiting the use of microcomputers. Respondents revealed that the lack of the following inhibited use in rank order (two through seven respectively): funding for hardware, funding for software, appropriate software, computer related pre-service, instructor's computer literacy, and knowledge of how to apply microcomputers to vocational agriculture. Respondents suggested the lack of computer related in-service and computer based curriculum were to a small degree inhibiting. The least inhibiting factor indicated by respondents was lack of support from school administration. There has been no mention in previous literature reviewed by the writer regarding the lack of instructor time as being a factor inhibiting use of

Table 12

Mean and Standard Deviation of Vocational Agriculture Teachers' Perceptions of Factors Inhibiting Microcomputer Usage (N=79)

Factor	Mean[a]	S.D.	Rank
Lack of time by instructor to learn more about computers	4.88	.97	1
Lack of funding for hardware	4.40	1.36	2
Lack of funding for software	4.20	1.32	3
Lack of appropriate software	4.19	1.17	4
Lack of computer related pre-service	4.15	.98	5
Lack of instructor's computer literacy	4.15	1.21	6
Lack of knowledge on how to apply computers into Vo-Ag	4.13	1.14	7
Lack of computer related in-service	3.95	1.04	8
Lack of computer based curriculum	3.81	1.14	9
Lack of appropriate hardware	3.62	1.35	10
Lack of support from school administration	3.55	1.37	11

[a]6 = Very Strongly Agree; 1 = Very Strongly Disagree

computers. Lack of computer related pre-service, expensive software, lack of computer based curriculum, lack of appropriate software, and lack of knowledge on how to apply computers to vocational agriculture were mentioned in previous studies (Zidon and Luft, 1987; Miller, et al., 1984; Bowen, et al., 1983; Cepica, et al., 1984; Church and Foster,

1984; and Neason and Miller, 1982). There were no factors that respondents tended to disagree with in regards to inhibiting use of microcomputers.

A profile of department and respondent characteristics involved in this study emerges and is reported in Table 13.

Characteristics of User and Non-User Groups

Inferential t-tests were used to determine if significant differences existed between respondents presently using computers or will be using them by 1989 (user group) and those respondents who never plan to use them or do not plan to use them until after 1989 (non-user group). No significant differences existed for the demographic variables years of teaching experience, number of students in the school, and the number of students in the vocational agriculture program. These data are presented in Table 14.

Factors Inhibiting Use

Inferential t-tests were run to determine if there were any significant differences in respondents' perceptions of factors inhibiting computer use between the user group and non-user group. Significant differences (.025 level of significance) existed for one variable. Non-users strongly agreed that the lack of instructor's computer literacy was a factor inhibiting the use of microcomputers in vocational

agriculture programs. The user group only agreed that the lack of computer literacy was a factor. Note that the assumption of normal distribution had been violated and the level of alpha was lowered to .025 to compensate for this violation. There were no other significant differences among the remaining variables. These data are presented in Table 15.

The Chi Square for Association was calculated to determine if there were any significant differences between the user group and non-user group responses concerning the in-service activities they would attend. A value of 10.077 was calculated for the Chi Square. This was not significant at an alpha level of .05. Therefore there are no difference between user and non-user choices of in-service activities.

Correlation for Selected Demographics

Correlations between selected demographic characteristics of the user group and the number of computers in the agriculture department are summarized in Table 16. There is a low positive correlation (.332) between the number of students in high school and the number of computers in the agriculture department. This small, but definite relationship suggests that, perhaps, schools with larger student populations have more funds available for purchasing of computers. There is a moderate positive correlation (.522) between the respondents years of teaching

Table 13

Profile of Department and Respondents' Characteristics

Characteristic	Typical Department/Respondent
Number of students in high school	Mean of 309.0 students
Number of students in agriculture department	Mean of 42.4 students
Years of experience teaching vo-ag	Mean of 11.8 years experience
Usage	Presently using computers (81%)
Computer location	Mean of 1.9 computers in the agriculture department Mean of 7.2 computers available in a computer laboratory
Computer brand	Apple (82%)
Peripherals available	Extra disk drive (83%) Dot matrix printer (83%)
Software types available	Ag specific (85%)
Most used software type	Ag specific (33%) Integrated (31%)
Instructional areas computers are used to assist instruction	Farm management (83%)
Management activities in which computers are used	Word processing (78%)
In-service activity would attend	Ag specific software related activity (35%)
Factor inhibiting use of computers in vo-ag programs	Lack of time to learn more about computers and software (mean of 4.9, strongly agree)

Table 14

T-tests of Demographic Characteristics by Users and Non-Users

Demographic Characteristics	User Group			Non-users Group			
	Mean	S.D.	n	Mean	S.D.	n	t
Years teaching experience	11.2	9.4	71	16.6	10.8	8	-1.525
Number of students in high school	312.5	322.8	63	281.4	262.6	8	.261
Number of students in vo-ag program	43.5	26.9	67	33.9	17.1	8	.982

Table 15

T-tests of Possible Factors Inhibiting Microcomputer Use by Users and Non-Users

	User Group			Non-users Group			
Variable	Mean	S.D.	n	Mean	S.D.	n	t
Lack of funding hardware	4.41	1.21	71	4.38	1.41	8	.065
Lack of funding software	4.18	1.32	71	4.38	1.41	8	-.386
Lack of computer literacy	4.04	1.18	71	5.13	1.13	8	-2.477*
Lack of knowledge how to apply	4.11	1.13	71	4.25	1.28	8	-.322
Lack of appropriate software	4.21	1.18	71	4.00	1.07	8	.483
Lack of appropriate hardware	3.58	1.38	71	4.00	1.07	8	-.836
Lack of support administration	3.51	1.35	71	3.94	1.61	8	-.840
Lack of computer curriculum	3.83	1.17	70	3.63	.916	8	.476
Lack of computer in-service	3.97	1.04	71	3.75	1.04	8	.571
Lack of computer pre-service	4.13	.99	70	4.38	1.04	8	-.670
Lack of instructor time to learn	4.89	.96	70	4.75	1.16	8	.698

*p<.025

Table 16

Pearson Product Correlation of Selected Demographics and Number of Computers in Agriculture Department

Department Variable	Demographic Variable	r
No. of Computers in Agriculture Department	Students in School (N=61)	.331*
	Students in Agriculture Department (N=67)	.197
	Years Teaching Experience	.522**

Note *p<.01. **p<.0001

experience and the number of computers in the agriculture department. This substantial relationship suggests that, perhaps, teachers with more teaching experience are aware of more funding sources then teachers with less experience.

Table 17 shows correlations between selected demographic data and respondents' perception of factors inhibiting the use of microcomputers in vocational agriculture programs. There is a low positive correlation (.388) between the number of students in the school and respondents' perception that the lack of computer based curriculum inhibits the use of computers. There was also a low correlation (.243) between the number of students in the agriculture

Table 17

Pearson Product Correlation of Selected Demographics and Factors Inhibiting Use of Computers

Inhibiting Factors	Selected Demographic Variables		
	Students in school (N=61)	Students in ag department (N=67)	Years of experience (N=71)
Lack of:			
Funding Hardware	.113	.089	.034
Funding Software	.036	.070	.092
Computer literacy	.110	.112	.130
Knowledge to apply	.187	.263**	.196
Appropriate software	.085	.126	-.127
Appropriate hardware	.037	-.031	-.132
Support from administration	.017	.072	.034
Computer Curriculum	.388***	.243*	.119
Computer in-service	.161	.131	.048
Computer pre-service	.101	.187	.115
Instructor time to learn	.020	.019	-.183

Note. *p<.05. **p<.025. ***p<.0025

department and respondents' perception that the lack of computer based curriculum could inhibit the use of computers. This could suggest that schools with higher student populations have more exact curriculum standards then schools with smaller student populations. Perhaps instructors in smaller schools have more flexibility with curriculum and the lack of computer based curriculum is not as much of concern as it might be in larger schools. There was also a small, but definite positive relationship (.263) between the number of students in the agriculture department and respondents' perception of the lack of knowledge of how to apply computers into the vocational agriculture program was inhibiting use of computers. This would suggest that instructors with larger classes may have more of a concern regarding how to use computers then instructors with smaller classes.

CHAPTER V

Conclusions and Recommendations

Introduction

This chapter serves as a summary of the study. The purpose, objectives, and methodology are reviewed. Major findings are reported along with conclusions and recommendations. Finally, attention is given to areas in need of further research.

Summary of the Study: Purpose and Objectives

The dual purpose of this study was to assess microcomputer use in Kansas vocational agriculture programs and identify teachers' perceptions of possible factors inhibiting microcomputer use.

Eight specific objectives were identified to accomplish the purpose of this study. They were:

1. To identify software being used in Kansas vocational agriculture programs;

2. To identify current uses of microcomputers in Kansas vocational agriculture programs;

3. To determine the types of hardware being used in vocational agriculture programs;

4. To identify factors that inhibit use of microcomputers in vocational agriculture programs;

5. To determine what microcomputer related in-service activities vocational agriculture instructors would attend;

6. To determine the relationships between vocational agriculture instructors' perceptions of factors inhibiting microcomputer usage and: years of teaching experience, number of students enrolled in vocational agriculture, and number of students in high school;

7. To determine the relationships between number of microcomputers in the vocational agriculture program and: years of teaching experience, number of students enrolled in vocational agriculture, and number of students in the high school;

8. To identify any differences between instructors that use computers in their program and instructors that do not use

computers in their program in regards to requested in-service activities and perceptions of possible factors inhibiting computer usage.

Methodology

This study was comprised of a descriptive survey of the use of microcomputers in Kansas vocational agriculture programs. The target population was defined as all of the secondary vocational agriculture programs in Kansas. A sample size of 87 secondary vocational agriculture instructors was randomly selected from the "1987-1988 Kansas Agriculture Education Instructor Directory".

A questionnaire was developed to gather data. These data included: 1) demographics, 2) hardware and software used, 3) areas of computer use, 4) in-service activities instructors would be interested in, and 5) Likert type items assessing teachers' perceptions of possible factors inhibiting computer use.

The questionnaire and transmittal letter were mailed to the selected sample. Two follow-up letters were also sent. A total of 81 responses were received for a response rate of 93.1%. Of the questionnaires returned, 79 usable returns were utilized for data analysis giving a useable response rate of 90.9%. Data analysis was

made with an Apple Macintosh Plus computer and the Macintosh Statistical System by StatSoft.

The eight objectives were tested in order to fulfill the purpose of the investigation. Descriptive statistics (means, standard deviations, and frequency counts) were used to satisfy the requirements of objectives one through five. In addition, Pearson product-moment correlation comparisons were utilized in order to fulfill the demands of objectives six and seven at the .05 level of significance. Finally, independent t-tests and Chi Square for independence were employed to answer the requirement of objective eight.

Major Findings

The major findings of the investigation were as follows:

1. Participating instructors had an average of 11.75 years vocational agriculture teaching experience, worked at a school with an average of 309 students, and taught in a vocational agriculture program with an average of 42 students.

2. Eighty-one percent of the respondents are presently using computers. An additional 8.9% will be using computers by 1989. Only 2.5% of the respondents indicated they never

plan to use computers in their vocational agriculture programs.

3. Computer laboratories had the most computers (512) available for vocational agriculture programs followed by vocational agriculture departments themselves (136).

4. Sixty-six of the 71 respondents (93%) that are presently using computers or will be using them by 1989, had one or more computers in the vocational agriculture department. The 7% without agriculture department computers use or will be using computers located in other parts of the school.

5. The most frequently used brand of computer among respondents was Apple (82.4%). IBM (8.1%) was the second most frequently used brand of computer.

6. An extra disk drive (59) and a dot matrix printer (59) were the most common peripherals available for use by vocational agriculture programs. Twenty-two agriculture departments had a modem available for use.

7. Agricultural specific software (84.5%) was the most available program for use as reported by respondents. Word

processing (67.6%) and spreadsheet (66.2%) software were second and third respectively. Agricultural specific software (32.8%) was also reported as being the most used type of software. Integrated software (31.2%) was reported as being the second most used.

8. Farm management (83.1%) was the most reported instructional area in which respondents used computers to assist with instruction. Agri-business (69.0%) and animal science (66.2%) were second and third respectively.

9. Word processing of class materials (77.5%) and correspondence (69.0%) were the computer assisted management activities reported most often.

10. An agricultural specific software related in-service activity was the activity selected most often by respondents (32.9%). An in-service activity dealing with spreadsheets was the second most requested activity. Even though respondents were asked to choose one activity, 19.7% of the respondents indicated two or more. Spreadsheets and/or agricultural specific software were requested by all of the respondents who marked more than one activity.

11. Respondents strongly indicated that lack of instructor time to learn more about the computers was a factor inhibiting computer use in vocational agriculture programs. Respondents revealed a lack of the following (in rank order) inhibited use: funding for hardware, funding for software, appropriate software, instructor computer literacy, and knowledge of how to apply computers to vocational agriculture programs.

12. Based on the analysis of selected demographic data among the user group and the non-user group, no significant difference was found between: 1) the user group's mean years of teaching experience (11.2) and the non-user group's mean year of teaching experience (16.6); 2) the mean number of students in the user group schools (312.5) and the mean number of students in the non-user group schools (281.4); and 3) the user group mean number of vocational agriculture students (43.5) and the non-user group mean number of vocational agriculture students (33.9).

13. Based on the analysis of possible factors inhibiting computer use among the user group and the non-user group, statistically significant differences (.025 level of significance) were found to exist between the user group mean score

(4.04) and the non-user group mean score (5.13) of the factor "lack of computer literacy inhibits computer use".

14. Based on the analysis of in-service activities preferred among the user group and the non-user group, no significant differences were found between the user group preferred in-service activities and the non-user group preferred in-service activities.

15. Based on a correlational analysis of selected demographic data relationships to the number of microcomputers in vocational agriculture departments, statistically significant relationships were found to exist between:
    a. The instructors' years of teaching experience and the number of computers in the agriculture department (r=.52).
    b. The number of students in the school and the number of computers in the agriculture department (r=.33).

16. Based on a correlational analysis of selected demographic data relationships to instructors' perceptions of possible factors inhibiting computer use, statistically significant relationships were found to exist between:

a. The number of students in school and the factor "lack of computer related curriculum (r=.39).
b. The number of students in the agriculture department and the factor "lack of computer related curriculum" (r=.24).
c. The number of students in the agriculture department and the factor "lack the knowledge of how to apply computers to vocational agriculture" (r=.26).

Conclusions

Analysis of the data resulted in the major findings from which the following conclusions are drawn.

1. A high percentage of Kansas vocational agriculture teachers have integrated microcomputers into their vocational agriculture programs. The remainder, save for a few, plan to incorporate microcomputers in the future. By 1989, nine out of ten Kansas vocational agriculture teachers will be using microcomputers in their instruction.

2. Special computer laboratories have the most computers available for use by Kansas vocational agriculture programs. However, a high percentage of vocational agriculture

teachers that utilize microcomputers in their programs have at least one computer located in the agriculture department.

3. The popularity of Apple and IBM computers among Kansas vocational agriculture teachers reflect the domination of these two companies in the commercial market. The prevalent use of Apple by Kansas vocational agriculture teachers may be a result of marketing and pricing strategies by Apple toward the educational market.

4. The percentage of modems reported in this study was higher than any percentage reported in previous studies reviewed by the writer. This finding seems to indicate a growing interest in microcomputer telecommunications and computer networks on the part of Kansas vocational agriculture teachers.

5. Agricultural specific software was the type of software most available to Kansas vocational agriculture teachers. In addition, agriculture specific software was the type of software that Kansas agriculture teachers employed the most. The most appropriate use of agricultural specific software is to assist instruction. The popularity of agricultural specific software suggests computer assisted

instruction was the microcomputer role most utilized by Kansas agriculture teachers. The prevalent use of microcomputers in the instructional areas of farm management, agri-business, and animal science parallel the current availability of software dealing with these areas of agriculture.

6. Integrated programs are a recent development in software. Despite only being available on the market for three years they were ranked fourth in availability of software types and ranked second as the software type most used by Kansas vocational agriculture teachers. Integrated programs were utilized more than word processing programs even though word processing was the prevailing aspect of computer managed instruction in which Kansas agriculture teachers used microcomputers. This seems to suggest that much of the word processing was being done on integrated programs. An increase in the use of integrated programs could result as agriculture teachers realize the capabilities of these programs.

7. Kansas vocational agriculture teachers would attend in-service activities dealing with agricultural specific software and spreadsheet software. The lack of computer related in-

service activities was a factor suggested by agriculture teachers as inhibiting the use of microcomputers in Kansas vocational agriculture programs.

8. Kansas vocational agriculture teachers perceive the lack of time to learn more about computers as the major factor inhibiting computer use in Kansas vocational agriculture programs. The lack of funding for hardware and software was also cited as a major factor inhibiting computer use.

9. Kansas vocational agriculture teachers who do not plan on using computers in the near future, or at all, perceive the lack of computer literacy as the leading factor inhibiting computer use in vocational agriculture programs. This differed significantly from the perceptions of agriculture teachers who are already using computers or will be by 1989. This group did not perceive the lack of computer literacy as a major factor inhibiting computer use. This finding may suggest that teachers not planning on using computers in the near future or at all lack computer literacy. As a result, these teachers are reluctant to incorporate microcomputers into their teaching.

10. There was a significant relationship between years of teaching experience and the number of computers in the agriculture department. Of teachers using computers the more experienced teachers tended to have a greater number of computers in the agriculture department. This relationship could be explained in two ways. One explanation could be the more experienced teachers are more aware of funding sources and are more skilled at securing these funds. Another explanation could be experienced teachers are better established and more confident in their teaching and are better able to incorporate new technology into their programs. Young teachers could be more concerned about solidifying basic teaching skills and not as able to add an additional methodology to their program of instruction.

11. Kansas vocational agriculture teachers in larger school and agriculture departments were more concerned with the lack of computer related curriculum. The teachers in larger agriculture departments were also more concerned with lacking knowledge of how to apply computers to vocational agriculture. This relationship could exist because of less flexibility in the curriculum of the larger schools as compared to smaller schools and agriculture departments.

As a result, vocational agriculture teachers would have a more difficult time incorporating a new teaching technology that lacked an accompanying curriculum.

Recommendations

Based on the findings of the study, conclusions drawn from the data, and the writer's observations and experiences, the following recommendations are suggested:

1. Microcomputers have become a notable instructional tool in Kansas vocational agriculture programs. As a result, competency in microcomputers is becoming a prerequisite for new vocational agriculture teachers. Pre-service training in relevant microcomputer competencies should be required for certification of new teachers. Competencies that should be taught include:
    a. agricultural specific, spreadsheet, word processing, integrated, and utility software packages;
    b. computer assisted instructional methods;
    c. computer related management activities;
    d. microcomputer telecommunications.

2. Computer related in-service activities should be offered for experienced vocational agriculture teachers. These activities should be offered at times in which the greatest percentage of interested instructors would be able to attend. Topics should include agricultural specific and spreadsheet software. In-service activities concerning spreadsheets should be taught using integrated programs. This would maximize the benefit of the in-service as agriculture teachers would obtain knowledge of both program applications. Microcomputer telecommunications should also be addressed.

3. Since Apple is the predominant brand of computer used by Kansas vocational agriculture teachers, pre-service and in-service training should be conducted primarily with this brand. Attention should also be given to IBM and IBM compatible computers.

4. Vocational agriculture teachers should be encouraged to share with each other successful microcomputer applications. Promising strategies for acquiring hardware and software should also be shared among agriculture teachers. The state staff should coordinate this exchage of information.

Workshops at summer conference may be an appropriate time for this to occur.

5. The possible establishment of a state wide agriculture education computer network should be investigated. An agriculture education network common to the state of Kansas would take advantage of the increasing field of microcomputer telecommunications. Information retreival, as well as information sharing, would be greatly facilitated for vocational agriculture teachers utilizing computers.

6. Computer related curriculum needs to be developed by the state staff. Appropriate computer assisted instruction should be incorporated into the curriculum of all instructional areas.

7. The state staff should initiate and coordinate a strategy in which Kansas vocational agriculture teachers can review software relevant to vocational agriculture. Actual software, as well as selection guidelines, should be available to aid agriculture teachers in the evaluation of software.

8. The Kansas Association of Future Farmers of America should establish a contest consisting of microcomputer competencies and agriculture related computer applications.

9. Vocational agriculture educators need to generate new lines of communication with the microcomputer industry in order to inform programmers and other developers of the software needs of agriculture and agriculture education. This information could result in the identification of existing software that could be adapted for use in agriculture.

Recommendations for Further Study

the following recommendations for further research are based on the research conducted in this study.

Additional research needs to be conducted into:

1. How microcomputers can best be put to use in the instruction of vocational agriculture.

2. The relationship of in-service activities and the implementation of microcomputers in regards to the different vocational subject matter areas.

3. The actual microcomputer applications employed by the commercial agricultural industry. This information is needed to insure that appropriate skills are being taught in vocational agriculture programs.

4. The effect of computer assisted instruction methods on vocational agriculture student learning.

5. Vocational agriculture teachers' time constraints in regards to the transfer of new technology.

6. The effects of new microcomputer technology will have on vocational agriculture education.

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APPENDICES

APPENDIX A

QUESTIONNAIRE

Kansas Vocational Agriculture Microcomputer Assessment Questionnaire

Note: Please complete this questionnaire as it relates to your school and the total vocational agriculture program.

PART I

Vo Ag Department_____ , _____
(School) *(District)*

Total number of students in the high school _____

Total number of students in your agriculture department _____

Years of teaching experience *(include the current school year)* _____

Please check the ONE statement below that best describes the use of computers in your vo-ag program.

_____ 1. I use computers as part of my vo-ag program.

_____ 2. I have not used computers, but I plan to begin using computers sometime during the 1987/88 or 1988/89 school year.

IF YOU CHECKED EITHER NUMBER 1 OR 2, PLEASE GO TO PART II ON PAGE 2 AND ANSWER PARTS II, III, IV, AND V

_____ 3. I have used computers in the past, but I decided not to use computers in the future.

_____ 4. I have not used computers, and I do not plan to use computers in the future.

_____ 5. I have not used computers, but I plan to begin using computers sometime after the 1988/89 school year.

IF YOU CHECKED EITHER NUMBER 3, 4, OR 5 PLEASE GO TO PART IV ON PAGE 4 AND ONLY ANSWER PARTS IV AND V

PART II

Location and Number of Microcomputers Available for use in your Vocational Agriculture Classes

(Please list the number of computers available in the appropriate blank.)

Vo Ag Dept _____ Special Computer Lab _____

Math Dept _____ Other Vocational Department(s) *(Please Specify)*

Science Dept _____

Other *(Please Specify)* _____ *(Dept)* *(Number)*

_____ *(Location)* *(Number)* _____ *(Dept)* *(Number)*

Make, Model and Number of Microcomputers Available for use in Vocational Agriculture Classes

(Please list all models and numbers of respective computers in your school that are available for Vo-Ag classes)

Apple, Model(s) _____ Number _____

Commodore, Model(s) _____ Number _____

IBM, Model(s) _____ Number _____

Radio Shack, Model(s) _____ Number _____

Texas Instruments, Model(s) _____ Number _____

Other, Make and Model(s) _____ Number _____

Microcomputer "Peripherals"
Available for use in Vo-Ag Classes

*(Please check the following **items** that apply to your program)*

_____ Extra disk drive

_____ Daisywheel printer

_____ Dot matrix printer

_____ Phone modem

_____ Other peripherals _____

_____

PLEASE GO ON TO PART III ON PAGE 3

Part III

Types of Software Available for use in Vo-Ag Classes
(Please check the following items that apply to your program)

1. _____ Agricultural specific software
2. _____ Spreadsheet software (*i.e.* Visicalc, Multiplan, Lotus 1,2,3,)
3. _____ Word processing software (*i.e.* Apple Writer, Wordstar)
4. _____ Database software (*i.e.* Profile III+, PFS File/Report, dBase III)
5. _____ Integrated software (*i.e.* Appleworks, Framework, Symphony)
6. _____ Games
7. _____ Teacher utility programs (*i.e.* Gradebook, inventories, testing)
8. _____ Other _____

Which one of the above types of software do you use the most? Please indicate the number (1-8) from above. Number _____.

Instructional Areas in which you use a Microcomputer to Assist in Instruction
(Please check the following items that apply to your program)

_____ Agri-Business
_____ Agricultural Careers
_____ Agricultural Mechanics
_____ Animal Science
_____ Crop and Soil Science
_____ Farm Management
_____ Horticulture
_____ Leadership (FFA)
_____ SOEP (class)

Management Activities in which you use a Microcomputer for Assistance
(Please check the following items that apply to your program)

_____ Contest tabulations
_____ Creating puzzles and/or quizzes
_____ Entertainment
_____ FFA financial activities
_____ FFA secretarial activities
_____ Grades management
_____ Mailing lists
_____ SOE and/or FFA awards
_____ SOE record keeping
_____ Spreadsheet for office use
_____ Test generation
_____ Word processing class material
_____ Word processing correspondence
_____ Word processing (other)

PLEASE GO ON TO PART IV ON PAGE 4

PART IV

Computer In-Service Courses

If all the computer in-service courses listed below were available, which one would you attend? Please check only **ONE** of the items below. If you prefer a course not listed below, write it in and check it. Please check only **one**.

_____ I would not attend a computer related in-service course
_____ General computer "literacy"
_____ Beginning Basic Programming
_____ Using Wordprocessing Software
_____ Using Spreadsheet Software
_____ Using Database Software
_____ Using Vo-Ag Instructional Software
_____ Using Integrated Software
_____ Other _____
(Please state preference)

PLEASE GO ON TO PART V ON PAGE 5

PART V

The following are descriptions of possible factors inhibiting use of computers in a Vo-Ag program. For each of these, circle the most appropriate response:

VSA....Very Strongly Agree that this would inhibit use
SA.....Strongly Agree that this would inhibit use
A.....Agree that this would inhibit use
D.....Disagree that this would inhibit use
SD.....Strongly Disagree that this would inhibit use
VSD....Very Strongly Disagree that this would inhibit use

1.	Lack of funding for purchase of hardware.	VSA	SA	A	D	SD	VSD
2.	Lack of funding for purchase of software.	VSA	SA	A	D	SD	VSD
3.	Lack of instructor's computer literacy.	VSA	SA	A	D	SD	VSD
4.	Lack of knowledge on how to apply computers into the Vo-Ag Program.	VSA	SA	A	D	SD	VSD
5.	Lack of appropriate software.	VSA	SA	A	D	SD	VSD
6.	Lack of appropriate hardware.	VSA	SA	A	D	SD	VSD
7.	Lack of support from school administration.	VSA	SA	A	D	SD	VSD
8.	Lack of computer based curriculum.	VSA	SA	A	D	SD	VSD
9.	Lack of computer related in-service.	VSA	SA	A	D	SD	VSD
10.	Lack of computer related pre-service.	VSA	SA	A	D	SD	VSD
11.	Lack of time by instructor to learn more about computers and software.	VSA	SA	A	D	SD	VSD

Please share any comments or suggestions in the space below concerning the usage of microcomputers in Kansas vocational agriculture.

WE APPRECIATE YOUR COOPERATION! Once you return this survey, you will have provided information needed to help vo-ag teachers across the state better utilize computers. Please return this survey in the self-addressed, stamped envelope. **If you care for a summary of the results check the following space.** _____ Yes, please send me a summary of the results of this study.

APPENDIX B

TRANSMITTAL LETTER

January 3, 1988

Mr. Jim Smith
Vocational Agriculture Instructor
Big High School
Big, Kansas, 12345

Dear Jim,

The attached survey instrument on the assessment of micro-computers in Kansas vocational agriculture programs is part of a statewide study being carried out in cooperation with the Agricultural Education Program at Kansas State University. This study is primarily concerned with the present status of microcomputer hardware and software and its use in Kansas vocational agriculture programs. The results of the study will help determine what in-service and pre-service activities may be needed for present and future instructors of vocational agriculture.

This area of agricultural education is growing at an amazing rate nationwide because agricultural educators recognize the importance of computers to the agricultural industry. It is important for vocational agriculture education in the state to continue to grow in this area.

Jim, your response is extremely important because of your experience in agricultural education and will contribute significantly toward an accurate assessment of microcomputers and their use in Kansas.

It will be appreciated if you will complete the enclosed form prior to January 15 and return it in the enclosed, stamped, self-addressed envelope. Other parts of the study cannot be carried out until the analysis of this survey is completed. Feel free to comment on any aspect of microcomputers and their use in your agriculture program that was not covered in the survey instrument. Your responses will be held in strictest confidence.

We will be pleased to send you a summary of the survey results if you desire, just check the appropriate box on the questionnaire. Thank you for your cooperation.

Sincerely,

Richard Welton, PhD
Teacher Educator
Agricultural Education

Matt R. Raven
Graduate Student
Agricultural Education

APPENDIX C

FIRST FOLLOW-UP LETTER

January 15, 1988

Mr. Jim Smith
Vocational Agriculture Instructor
Big High School
Big, Kansas, 1234

Dear Jim,

The response to our survey of microcomputers in Kansas agriculture programs has been good, but we need your response to make it even better. Your response is required to insure that the data we collect is represenative of Kansas vocational agriculture programs. This study will help determine future computer related curriculum and in-service activities. Jim, please make sure that 's agriculture program contributes to this important study and return your questionnaire today. Thank you for your time and commitment to Kansas vocational agriculture.

Sincerely,

Richard Welton
Teacher Educator
Agricultural Education

Matt R. Raven
Graduate Student
Agricultural Education

APPENDIX D

SECOND FOLLOW-UP LETTER

January 27, 1988

Mr. Jim Smith
Vocational Agriculture Instructor
Big High School
Big, Kansas, 12345

Dear Jim,

The response to our microcomputer survey has been tremendous. I want to make sure that your input helps contribute to this important study. Jim, this survey will have strong implications in future curriculum and inservice activities. Please take a minute and fill out the enclosed survey today. This is your chance to provide your experience for the betterment of Kansas vocational agriculture. Thank you for your help.

Sincerely,

Richard Welton
Professor
Agricultural Education

APPENDIX E

QUESTIONNAIRE REVIEW COMMITTEE

The following individuals assisted in reviewing and refining items on the Kansas Vocational Agriculture Microcomputer Assessment Questionnaire:

Dr. Richard F. Welton
Professor
Agricultural Education

Dr. John D. Parmley
Associate Professor
Agricultural Education

Dr. Steve Harbstreit
Assistant Professor
Agricultural Education

Mr. Marvin Hachmeister
Instructor
Agricultural Education

Dr. Robert Newhouse
Professor
Counseling Education and Educational Psychology

Ms. Becca Flowers
Graduate Student
Agricultural Education

Ms. Kathy Holmes
Graduate Student
Agricultural Education

AN ASSESSMENT OF THE USE OF MICROCOMPUTERS IN KANSAS VOCATIONAL AGRICULTURE PROGRAMS

by

MATT ROBERT RAVEN

B.S., University of California, Davis, 1982

AN ABSTRACT OF A THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

AGRICULTURAL EDUCATION

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1988

ABSTRACT

The primary purpose of this study was to assess the use of microcomputers in Kansas vocational agriculture programs. A non-standardized survey instrument was constructed for this study. Responses from this questionnaire were used in selected statistical procedures. Eighty-one subjects completed the questionnaire for this study.

This study was designed to determine microcomputer usage, available hardware and software, instructional areas and management activities microcomputers are used, preferred in-service activities, and possible factors inhibiting microcomputer use. Relationships between selected demographics and number of microcomputers in agriculture departments as well as respondents' perceptions of factors inhibiting microcomputer use were determined using Pearson product-moment correlation. T-tests were used to determine significant differences between respondents using microcomputers and respondents not using microcomputers in regards to subjects' perceptions of factors inhibiting microcomputer use and selected demographics. Both tests analyzed data at the .05 level of significance.

Eighty-one percent of the respondents were using microcomputers in their teaching. Computer laboratories followed by agriculture departments had the greatest number of microcomputers available for vocational agriculture classes. Eighty-two percent of the microcomputers in agriculture departments were Apples. Eighty-three percent of the respondents using computers had a printer and an extra disk drive. Agricultural specific software was the most available (85%) and the most used (33%) type of software. Farm management was the instructional area in which microcomputers were most frequently used. Word processing was the

management activity in which microcomputers were most frequently used. An in-service activity dealing with agricultural specific software would be attended by the greatest percentage of respondents (35%). Lack of instructor time to learn more about computers was cited as the major factor inhibiting microcomputer use.

Statistically significant relationships were found to exist between: 1) the instructor's years of teaching experience and the number of microcomputers in the agriculture department, 2) the number of students in the school and the number of computers in the agriculture department, 3) the number of students in the school as well as the number of students in the agriculture department and the teacher's perception of the lack of computer related curriculum as a factor inhibiting computer use, and 4) the number of students in the agriculture department and the teacher's perception of the lack of knowledge of how to apply microcomputers as a factor inhibiting use.

No significant differences were found between selected demographics and subjects who use microcomputers and subjects who do not use microcomputers. A statistically significant difference was found between the subjects who use computers and subjects who do not use computers in regards to their perception of the lack of computer literacy as being an factor inhibiting microcomputer use.